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ABSTRACT

This study was conducted to investigate the microcomputer experience of female preservice teachers. A questionnaire developed to evaluate prior computer experiences of teacher education students enrolled in an educational technology and media course was administered during the first week of class. The sample included 40 males and 215 females. During the weeks that followed, informal interviews adddressed items on the questionnaire, and responses were recorded in writing. Findings suggest that the majority of female preservice teachers lack extensive prior experience with computing, reflecting a dearth of opportunity in elementary and secondary education. This implies that equitable access to computers and classes is critical; support for females to enter technical careers that require computing must be given before college; buying computers for females is essential; incorporating activities into the classrooms that appeal to females as well as males will encourage computer use by females; using E-mail, spreadsheets, creating mailing lists and mail merge with a database demonstrate practical activities that are meaningful to males and females. If opportunities for females are not provided, the gap between male and female computing experience will widen. (Contains 14 annotated references.) (LL)

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FEMALE PRESERVICE TEACHERS' PRIOR EXPERIENCE WITH COMPUTING

by

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Female Preservice Teachers' Prior Experience with Computing

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Presented to the 18th Annual Conference: Research on Women in Education on November 13, 1992

ABSTRACT

The use of microcomputers in the classroom has been shown to enhance learning. In addition, the use of technological applications has permeated managerial duties and all content areas. The majority of pre-service teachers at this southeastern university were female and lacked extensive prior experience with computing. This reflects a lack of opportunities in elementary-, middle-, and secondary- school education. If opportunities for females are not provided, the gap between male and female computing experience and role models will increase. The most common computing experiences were playing games and word processing. Less than 30% of the students reported that they used spread sheets and less than 10% reported using databases, electronic mail, or programming in any language. Most of the 30% who reported owning computers actually used systems purchased for male members of their households. The perception of education as a completely non-technical field is not accurate.

Background

Many teacher educators agree that it is imperative that pre-service teacher preparation provides an appropriate experiential base in educational technology (Bush & Cobb, 1984). Pre-service experience should enhance the integration of microcomputers into classroom teaching. Niess (1990) describes several competencies which should allow a teacher to "demonstrate familiarity with the everyday operation of computer software and hardware in order to troubleshoot minor problems and with various computer labs structures and their management (p. 13)." Brownell (1990) stated that it was once assumed that preservice teachers would begin their program with adequate computer knowledge but that a general user of a computer needs specific educational applications. However, the quantity and quality of female preservice teacher general computer use remains in question.

In a study conducted at the State University of New York at Buffalo, over 50% of 324 preservice teachers never used a computer during their college experience (Beaver, 1990). This may be due to a lack of equitable opportunity (Smith, 1987), a lack of self efficacy (Miura, 1987), societal pressure (Jagacinski, LeBold, & Salvendy, 1988), or stereotyped prerequisites for success (Demetrulias & Rosenthal, 1985; Siann, Durndell, Macleod, & Glisssov, 1988). Ultimately, the inequities and causes that contribute to the lack of computing experience become cumulative when teachers, predominantly female, do not use or encourage the use of computers in the classroom (Chambers & Clarke, 1987).

Methods

This study investigated the computing experience that 215 female preservice teachers reported. The role of other factors including age, computer ownership, and prior computing classes were considered. A check-list type of questionnaire was completed at the beginning of a required course. The resulting frequencies were analyzed using chi- square goodness-of-fit tests. The questionnaire also identified individual characteristics and this information was cross-tabulated with the frequencies and subjected to chi-square goodness-of-fit tests for significance.

Students

A questionnaire was administered to 255 students enrolled in an undergraduate education technology and media course at Old Dominion University during the first week of class. The course was required for students enrolled in education programs for elementary schools, middle schools, and secondary schools certification. The participants in the study were drawn from all sections of the course and not just from the investigator's sections. The 255 students included 16%

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(n=40) males and 84% (n=215) females. Overall, 51% of the students were seeking certification for elementary or middle school teaching, 29% for secondary school teaching, and 20% sought certification for teaching physical education, art education, or foreign language education. Old Dominion University is an urban university with a minority student population of approximately 12%. Due to the presence of naval bases and NASA, ODU students are not necessarily from the immediate geographical area.

Questionnaire

A questionnaire was developed for the purpose of evaluating the prior experience of preservice teachers enrolled in an educational technology course. The first open-ended set of questions identified the student's program, asked about ownership of a microcomputer, the student's age, and asked if the student ever completed a prior class in computing. The next portion of the instrument posed a checklist of 6 different general-use experiences with microcomputers. Students checked the activities in which they had participated.

Interviews

During the weeks that followed questionnaire administration, informal interviews addressed the items on the questionnaire. Probing questions followed responses. Responses were recorded by the investigator in writing on the questionnaires. All students agreed to participate when the purpose of the study was explained. They did not receive bonus points or other direct extrinsic motivation.

Results

The questionnaires yielded quantitative data which was enhanced by qualitative information received from the interviews (Table 1). About half of the female students were between the age of 18 and 21 and half were 22 or older. Most of the females did not own computers. Playing computer games and word processing were the leading computing experiences with electronic mail and databases the least used applications. Of the female students who had taken a computer class before enrolling in the education program, most of them were also between the age of 18 and 21.

Table 1. Characteristics of female preservice students.

	Age group					
	18-21	22-25	26-29	30-25	36+	Total
Total n=	99	50	38	16	12	215
Own Computer	37	7	11	7	4	66
Prior Class	51	22	20	8	3	104
Play Games	94	42	32	15	7	190
Word Process	86	37	29	15	7	172
Spread Sheet	35	10	10	6	1	62
Data Base	30	11	6	6	1	54
Program	33	11	6	4	2	56
E-Mail	14	1	5	4	1	25

Microcomputer Ownership

While 31% (n=66) of the females reported owning microcomputers, the interview results qualified that ownership. In response to questions during interviews, 33% (n=22) of these students reported that the microcomputers they "owned" had been purchased by male members of their household and that those males were the principal users. Students in that group reported that they were only "allowed to use the computer to type term papers," "mostly played computer games with a spouse," or "helped children with homework." During the interview, they all made comments that indicated performance by rote and an inability to troubleshoot minor problems.

The remaining female students who owned computers reported that they "received it as a high-school graduation gift", "bought it in order to work at home", "bought the same kind that was used in an outside job" or "bought it after taking a class I enjoyed". After discriminating among age groups and principal ownership, a significant majority of

females who owned computers were between the ages of 18 and 25.

Prior experience

Games and word processing were the most common computer applications. Of the 54 students who reported using databases, 24 reported that they performed part-time job functions by rote and did not set up the database they were using. For example, one student said that she "did mail-merge" at her job but that she "followed directions her boss wrote on an index card." The 30 students who were within the 18-21 age group who owned computers reported that they learned how to use a database during high- school computing courses. These individuals also maintained personal databases for various functions such as keeping track of audio cassettes, books, or personal mailing lists.

Identifying applications according to age further quantified the results. Fifty-six percent (n=35) of the 62 students who reported that they used spreadsheets were within the 18-21 age group. Interview reports indicated that these individuals were also principal owners of microcomputers. They reported that they routinely used integrated software packages which featured word processing, spreadsheet, and database applications. The remaining 44% (n=27) reported using spreadsheet applications at a job or for joint financial management with a male member of the household. Further questioning of 18 individuals indicated that interactions were initiated and/or supervised by a male member of the household. The remaining 9 individuals who reported using spreadsheets at a job followed instructions by rote and could not independently set up a spreadsheet.

Prior Classes

Interview results indicated that students within the 18-21 age group took a computing class in high school. Eleven students within the 22-25 age group had a computing class as part of their high school curriculum. Thirty-one students who were older than 25 reported taking a class in a community college, a job training program, or had majored in a technical field and changed to education. For example, one student started a computer science program but reported that it "wasn't very interesting." Another individual was changing careers from nursing to teaching and had completed a training session with the hospital computer system.

General Users

The majority of female preservice teachers who had taken other computing classes were within the 18-25 age group. Within this 18-25 age group, 29% (n=44) reported that they were the principal owners/users of microcomputers. These were also the same individuals who used word processing and spreadsheet applications. Twenty- five of these individuals also used electronic mail functions such as Compuserve and Prodigy, database applications, reported performing mail merge functions and had programed in BASIC during their high-school computing course. Of the students over the age of 25, 15% (n=10) regularly used a microcomputer purchased by a male member of the household to play games, word process, and maintain financial records using a spreadsheet. This results in a total of 54 independently performing general-users out of the total 215 female preservice teachers, or 25% of the sample.

Discussion

Brownell (1990) suggested that, in a computer education course, preservice teachers should expand from general computer use to educational applications. However, the results of this study place the quality of general computer use by female preservice teachers in question. From his survey, over 90% of participating teacher educators suggested that a classroom teacher should be able to use word processing, data base, and spreadsheet applications. Yet, only 25% (n=54) of the 215 female preservice teachers in the subject population were able to use those applications.

These recommendations and results highlight the problems found in the relationship between gender and computing. This low number of general users could be attributed to generally negative attitudes and a lack of self-efficacy held by females (Collis & Williams, 1987). This lack of positive attitudes and self-efficacy is directly attributable to a lack of experience (Chen, 1986). Smith (1987) showed that, as female teachers became more experienced with computers, their self-efficacy increased and attitudes became positive. These teachers also showed stronger feelings for equity in

computer use and career choices for females. Since teachers as role models play an important part in their students' attitudes about computers and technical careers, competency is imperative.

Implications

Teacher preparation programs must not only provide for general use of computers but also for the specialized educational applications of technology. Unfortunately, the scope of an educational computing course is limited by time and space and cannot be expected to remediate inequities in elementary-, middle-, and secondary-school preparation. Equitable access to computers and classes is critical. Support for females to enter technical careers that require computing must be given before college. Buying computers for females is essential for their success. Incorporating activities into the classroom that appeal to females as well as males will encourage computer use by females. Using e-mail to correspond with other students, learning how to create and follow a budget using a spreadsheet, creating a mailing list and mail merge with a database demonstrate practical activities that are meaningful to males and females. Providing a warm, interactive classroom environment with opportunities for cooperative learning and group achievement foster positive attitudes.

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